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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,191	01/20/2004	Kazumi Matsushige	2004-0076	7701
513 7590 05/03/2007 WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021			EXAMINER ABOAGYE, MICHAEL	
			ART UNIT 1725	PAPER NUMBER
			MAIL DATE 05/03/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/759,191	Applicant(s) MATSUSHIGE ET AL.	
	Examiner Michael Aboagye	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 40-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/009,168.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/30/2007</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 40-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Sekhar. (US Patent No. 5,094,700).

Sekhar discloses a joined object (column 1, lines 24 and 46) by soldering with a lead-free solder; wherein the lead-free solder is an alloy of tin (column 2, lines 30-36 and lines 60-65); wherein the lead free solder includes a metal (i.e. Indium or Bismuth) acting to decrease the melting point of the solder (column 1, lines 31-35); wherein the lead-free solder has a Sn-Ag based composition as a main ingredient (column 2, line 30-35); wherein the joined object further comprises a layer of a compound of Sn and Cu at the joining interface (column 2, lines 30-40); wherein the melting point depressant is at least one of Bi, Cu, Zn and In (column 1, lines 31-35 and column 2, line 30-35); Sekhar teaches lead free solder at joint with no micro-segregation (Sekhar, column 3, lines 36-40); forming uniformly dispersed phases at the joint (Sekhar, column 2, lines 5-10).

It is noted that the micro-structural characterization taught by Sekhar implies non-segregated structure. The micrographs in figures also distinctly show uniformly distributed microstructure with no segregation.

3. Claims 40-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamaguchi et al. (US Patent No. 5,918,795).

Yamaguchi et al. discloses a joined object (electronic component)(column 1, lines 5-7) by soldering with a lead-free solder which comprises an alloy of tin (Abstract, column 1, lines 51-67); solidifying the lead free alloy by quenching and forming a finely dispersed structure which enhances the mechanical strength and the thermal fatigue strength of the joint (column 3, lines 1-6; column 2, lines 60-64; and column 5, lines 3-13). The lead free solder includes a metal (i.e. Indium and Bismuth) acting to decrease the melting point of the solder (column 2, lines 1-4); wherein the lead-free solder has a Sn-Ag based composition as a main ingredient (column 1, lines 60-65 and column 3, lines 66-67); wherein the metal that decreases the melting point is at least one of Bi, Cu, Zn and In (column 1, lines 65-67, and column 2, lines 1-18); wherein at least the article and the member contain Cu. Said Cu from the article and the member combining with Sn from the lead free solder to form a Sn-Cu layer at the joint interface which intensifies the bond strength (column 2, lines 1-4, 15-17 and column 3, lines 1-5).

Yamaguchi et al. also teaches forming a joint having finely dispersed microstructure, while restraining the formation of inter-metallic compounds within the joint structure thereby enhancing the mechanical strength of the joint (column 2, lines

60-64). Note, said finely dispersed microstructure is interpreted by the examiner as a non-segregated microstructure.

### ***Response to Arguments***

4. The examiner acknowledges the applicants' amendment received by USPTO on March 30, 2007. Claims 1-39 have been cancelled, new claims 40-44 are currently under consideration in this application.

5. Applicant's arguments filed March 30, 2007 have been fully considered but they are not persuasive.

Regarding applicant's argument that Sekhar does not teach no segregation of components contained in the lead free solder. It is noted that Sekhar teaches lead free solder at joint with no micro-segregation (Sekhar, column 3, lines 36-40); forming uniformly dispersed phases at the joint (Sekhar, column 2, lines 5-10). It is noted that all these micro-structural characterization implies non-segregated structure. Further, attention is drawn to the micrographs, which distinctly show uniformly distributed microstructure with no segregation.

Regarding applicant's argument that Yamaguchi et al. does not teach no segregation of components contained in the lead free solder. It is noted that Yamaguchi et al. teaches forming a joint having finely dispersed microstructure, while restraining the formation of inter-metallic compounds within the joint structure thereby enhancing

Art Unit: 1725

the mechanical strength of the joint (column 2, lines 60-64). Note, said finely dispersed microstructure is interpreted by the examiner as a non-segregated microstructure.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Aboagye whose telephone number is 571-272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

Art Unit: 1725

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**JONATHAN JOHNSON**  
**PRIMARY EXAMINER**



**Michael Aboagye**  
**Assistant Examiner**  
**Art Unit 1725**

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04/27/2007